



#3

SEQUENCE LISTING

<110> Georgopoulos, Katia

<120> IKAROS REGULATORY ELEMENTS AND USES
THEREOF

<130> 10287-067001

<140> US 09/755,830

<141> 2001-01-05

<150> US 08/283,300

<151> 1994-07-29

<150> US 08/238,212

<151> 1994-05-02

<150> US 08/121,438

<151> 1993-09-14

<150> US 07/946,233

<151> 1992-09-14

<160> 43

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1788

<212> DNA

<213> Mus musculus

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<221> CDS

<222> (223) ... (1515)

<223> mIk-2

<400> 1

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ccactcagag gggactcaga gcaagtctag atttgtgtgg cagagagaga cagctctcgt      180
ttggccttgg ggaggcacia gtctgttgat aacctgaaga ca atg gat gtc gat      234
                               Met Asp Val Asp
                               1
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gag ggt caa gac atg tcc caa gtt tca gga aag gag agc ccc cca gtc      282
Glu Gly Gln Asp Met Ser Gln Val Ser Gly Lys Glu Ser Pro Pro Val
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agt gac act cca gat gaa ggg gat gag ccc atg cct gtc cct gag gac      330
Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro Val Pro Glu Asp
25              30              35
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ctg tcc act acc tct gga gca cag cag aac tcc aag agt gat cga ggc      378
Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys Ser Asp Arg Gly
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"FASTSEQ" version 4.0

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cag	aaa	ggc	aac	ctc	ctg	cgg	cac	atc	aag	ctg	cac	tcg	ggt	gag	aag	474		
Gln	Lys	Gly	Asn	Leu	Leu	Arg	His	Ile	Lys	Leu	His	Ser	Gly	Glu	Lys			
70						75						80						
ccc	ttc	aaa	tgc	cat	ctt	tgc	aac	tat	gcc	tgc	cgc	cgg	agg	gac	gcc	522		
Pro	Phe	Lys	Cys	His	Leu	Cys	Asn	Tyr	Ala	Cys	Arg	Arg	Arg	Asp	Ala			
85				90						95				100				
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Leu	Thr	Gly	His	Leu	Arg	Thr	His	Ser	Val	Gly	Lys	Pro	His	Lys	Cys			
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gga	tat	tgt	ggc	cgg	agc	tat	aaa	cag	cga	agc	tct	tta	gag	gag	cat	618		
Gly	Tyr	Cys	Gly	Arg	Ser	Tyr	Lys	Gln	Arg	Ser	Ser	Leu	Glu	Glu	His			
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aaa	gag	cga	tgc	cac	aac	tac	ttg	gaa	agc	atg	ggc	ctt	ccg	ggc	gtg	666		
Lys	Glu	Arg	Cys	His	Asn	Tyr	Leu	Glu	Ser	Met	Gly	Leu	Pro	Gly	Val			
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tgc	cca	gtc	att	aag	gaa	gaa	act	aac	cac	aac	gag	atg	gca	gaa	gac	714		
Cys	Pro	Val	Ile	Lys	Glu	Glu	Thr	Asn	His	Asn	Glu	Met	Ala	Glu	Asp			
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ctg	tgc	aag	ata	gga	gca	gag	agg	tcc	ctt	gtc	ctg	gac	agg	ctg	gca	762		
Leu	Cys	Lys	Ile	Gly	Ala	Glu	Arg	Ser	Leu	Val	Leu	Asp	Arg	Leu	Ala			
165						170						175			180			
agc	aat	gtc	gcc	aaa	cgt	aag	agc	tct	atg	cct	cag	aaa	ttt	ctt	gga	810		
Ser	Asn	Val	Ala	Lys	Arg	Lys	Ser	Ser	Met	Pro	Gln	Lys	Phe	Leu	Gly			
			185						190						195			
gac	aag	tgc	ctg	tca	gac	atg	ccc	tat	gac	agt	gcc	aac	tat	gag	aag	858		
Asp	Lys	Cys	Leu	Ser	Asp	Met	Pro	Tyr	Asp	Ser	Ala	Asn	Tyr	Glu	Lys			
			200						205						210			
gag	gat	atg	atg	aca	tcc	cac	gtg	atg	gac	cag	gcc	atc	aac	aat	gcc	906		
Glu	Asp	Met	Met	Thr	Ser	His	Val	Met	Asp	Gln	Ala	Ile	Asn	Asn	Ala			
215						220						225						
atc	aac	tac	ctg	ggg	gct	gag	tcc	ctg	cgc	cca	ttg	gtg	cag	aca	ccc	954		
Ile	Asn	Tyr	Leu	Gly	Ala	Glu	Ser	Leu	Arg	Pro	Leu	Val	Gln	Thr	Pro			
230						235						240						
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Pro	Gly	Ser	Ser	Glu	Val	Val	Pro	Val	Ile	Ser	Ser	Met	Tyr	Gln	Leu			
245						250						255			260			
cac	aag	ccc	ccc	tca	gat	ggc	ccc	cca	cgg	tcc	aac	cat	tca	gca	cag	1050		
His	Lys	Pro	Pro	Ser	Asp	Gly	Pro											

gac gcc gtg gat aac ttg ctg ctg ctg tcc aag gcc aag tct gtg tca 1098
 Asp Ala Val Asp Asn Leu Leu Leu Leu Ser Lys Ala Lys Ser Val Ser
 280 285 290

tcg gag cga gag gcc tcc ccg agc aac agc tgc caa gac tcc aca gat 1146
 Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp
 295 300 305

aca gag agc aac gcg gag gaa cag cgc agc ggc ctt atc tac cta acc 1194
 Thr Glu Ser Asn Ala Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr
 310 315 320

aac cac atc aac ccg cat gca cgc aat ggg ctg gct ctc aag gag gag 1242
 Asn His Ile Asn Pro His Ala Arg Asn Gly Leu Ala Leu Lys Glu Glu
 325 330 335 340

cag cgc gcc tac gag gtg ctg agg gcg gcc tca gag aac tcg cag gat 1290
 Gln Arg Ala Tyr Glu Val Leu Arg Ala Ala Ser Glu Asn Ser Gln Asp
 345 350 355

gcc ttc cgt gtg gtc agc acg agt ggc gag cag ctg aag gtg tac aag 1338
 Ala Phe Arg Val Val Ser Thr Ser Gly Glu Gln Leu Lys Val Tyr Lys
 360 365 370

tgc gaa cac tgc cgc gtg ctc ttc ctg gat cac gtc atg tat acc att 1386
 Cys Glu His Cys Arg Val Leu Phe Leu Asp His Val Met Tyr Thr Ile
 375 380 385

cac atg ggc tgc cat ggc tgc cat ggc ttt cgg gat ccc ttt gag tgt 1434
 His Met Gly Cys His Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys
 390 395 400

aac atg tgt ggt tat cac agc cag gac agg tac gag ttc tca tcc cat 1482
 Asn Met Cys Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser Ser His
 405 410 415 420

atc acg cgg ggg gag cat cgt tac cac ctg agc taaacccagc caggccccac 1535
 Ile Thr Arg Gly Glu His Arg Tyr His Leu Ser
 425 430

tgaagcacia agatagctgg ttatgcctcc ttcccggcag ctggaccac agcggacaat 1595
 gtgggagtgg atttgcaggc agcatttggt cttttatggt ggttgtttg cgtttcattt 1655
 gcgttggaag ataagttttt aatgttagtg acaggattgc attgcatcag caacattcac 1715
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 <213> Homo sapiens

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 <222> (1) ... (1386)
 <223> hIk-1

<400> 2

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 gaa atg aat ggg gaa gaa tgt gcg gag gat tta cga atg ctt gat gcc	96
Glu Met Asn Gly Glu Glu Cys Ala Glu Asp Leu Arg Met Leu Asp Ala	
20 25 30	
 tcg gga gag aaa atg aat ggc tcc cac agg gac caa ggc agc tcg gct	144
Ser Gly Glu Lys Met Asn Gly Ser His Arg Asp Gln Gly Ser Ser Ala	
35 40 45	
 ttg tcg gga gtt gga ggc att cga ctt cct aac gga aaa cta aag tgt	192
Leu Ser Gly Val Gly Gly Ile Arg Leu Pro Asn Gly Lys Leu Lys Cys	
50 55 60	
 gat atc tgt ggg atc att tgc atc ggg ccc aat gtg ctc atg gtt cac	240
Asp Ile Cys Gly Ile Ile Cys Ile Gly Pro Asn Val Leu Met Val His	
65 70 75 80	
 aaa aga agc cac act gga gaa cgg ccc ttc cag tgc aat cag tgc ggg	288
Lys Arg Ser His Thr Gly Glu Arg Pro Phe Gln Cys Asn Gln Cys Gly	
85 90 95	
 gcc tca ttc acc cag aag ggc aac ctg ctc cgg cac atc aag ctg cat	336
Ala Ser Phe Thr Gln Lys Gly Asn Leu Leu Arg His Ile Lys Leu His	
100 105 110	
 tcc ggg gag aag ccc ttc aaa tgc cac ctc tgc aac tac gcc tgc cgc	384
Ser Gly Glu Lys Pro Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg	
115 120 125	
 cgg agg gac gcc ctc act ggc cac ctg agg acg cac tcc gtt ggt aaa	432
Arg Arg Asp Ala Leu Thr Gly His Leu Arg Thr His Ser Val Gly Lys	
130 135 140	
 cct cac aaa tgt gga tat tgt ggc cga agc tat aaa cag cga acg tct	480
Pro His Lys Cys Gly Tyr Cys Gly Arg Ser Tyr Lys Gln Arg Thr Ser	
145 150 155 160	
 tta gag gaa cat aaa gag cgc tgc cac aac tac ttg gaa agc atg ggc	528
Leu Glu Glu His Lys Glu Arg Cys His Asn Tyr Leu Glu Ser Met Gly	
165 170 175	
 ctt ccg ggc aca ctg tac cca gtc att aaa gaa gaa act aag cac agt	576
Leu Pro Gly Thr Leu Tyr Pro Val Ile Lys Glu Glu Thr Lys His Ser	
180 185 190	
 gaa atg gca gaa gac ctg tgc aag ata gga tca gag aga tct ctc gtg	624
Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ser Glu Arg Ser Leu Val	
195 200 205	
 ctg gac aga cta gca agt aat gtc gcc aaa cgt aag agc tct atg cct	672
Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met Pro	
210 215 220	

cag aaa ttt ctt ggg gac aag ggc ctg tcc gac acg ccc tac gac agt	720
Gln Lys Phe Leu Gly Asp Lys Gly Leu Ser Asp Thr Pro Tyr Asp Ser	
225 230 235 240	
gcc acg tac gag aag gag aac gaa atg atg aag tcc cac gtg atg gac	768
Ala Thr Tyr Glu Lys Glu Asn Glu Met Met Lys Ser His Val Met Asp	
245 250 255	
caa gcc atc aac aac gcc atc aac tac ctg ggg gcc gag tcc ctg cgc	816
Gln Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu Arg	
260 265 270	
ccg ctg gtg cag acg ccc ccg ggc ggt tcc gag gtg gtc ccg gtc atc	864
Pro Leu Val Gln Thr Pro Pro Gly Gly Ser Glu Val Val Pro Val Ile	
275 280 285	
agc ccg atg tac cag ctg cac agg cgc tcg gag ggc acc ccg cgc tcc	912
Ser Pro Met Tyr Gln Leu His Arg Arg Ser Glu Gly Thr Pro Arg Ser	
290 295 300	
aac cac tcg gcc cag gac agc gcc gtg gag tac ctg ctg ctg ctc tcc	960
Asn His Ser Ala Gln Asp Ser Ala Val Glu Tyr Leu Leu Leu Leu Ser	
305 310 315 320	
aag gcc aag ttg gtg ccc tcg gag cgc gag gcg tcc ccg agc aac agc	1008
Lys Ala Lys Leu Val Pro Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser	
325 330 335	
tgc caa gac tcc acg gac acc gag agc aac aac gag gag cag cgc agc	1056
Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Asn Glu Glu Gln Arg Ser	
340 345 350	
ggc ctt atc tac ctg acc aac cac atc gcc cga cgc gcg caa cgc gtg	1104
Gly Leu Ile Tyr Leu Thr Asn His Ile Ala Arg Arg Ala Gln Arg Val	
355 360 365	
tcg ctc aag gag gag cac cgc gcc tac gac ctg ctg cgc gcc gcc tcc	1152
Ser Leu Lys Glu Glu His Arg Ala Tyr Asp Leu Leu Arg Ala Ala Ser	
370 375 380	
gag aac tcg cag gac gcg ctc cgc gtg gtc agc acc agc ggg gag cag	1200
Glu Asn Ser Gln Asp Ala Leu Arg Val Val Ser Thr Ser Gly Glu Gln	
385 390 395 400	
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Met Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu Asp His	
405 410 415	
gtc atg tac acc atc cac atg ggc tgc cac ggc ttc cgt gat cct ttt	1296
Val Met Tyr Thr Ile His Met Gly Cys His Gly Phe Arg Asp Pro Phe	
420 425 430	
gag tgc aac atg tgc ggc tac cac agc cag gac cgg tac gag ttc tcg	1344
Glu Cys Asn Met Cys Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser	
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Ser His Ile Thr Arg Gly Glu His Arg Phe His Met Ser
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 <213> Mus musculus

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 <223> mIk-3

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 Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro
 20 25 30
 gtc cct gag gac ctg tcc act acc tct gga gca cag cag aac tcc aag 144
 Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys
 35 40 45
 agt gat cga ggc atg gcc agt aat gtt aaa gta gag act cag agt gat 192
 Ser Asp Arg Gly Met Ala Ser Asn Val Lys Val Glu Thr Gln Ser Asp
 50 55 60
 gaa gag aat ggg cgt gcc tgt gaa atg aat ggg gaa gaa tgt gca gag 240
 Glu Glu Asn Gly Arg Ala Cys Glu Met Asn Gly Glu Glu Cys Ala Glu
 65 70 75 80
 gat tta cga atg ctt gat gcc tcg gga gag aaa atg aat ggc tcc cac 288
 Asp Leu Arg Met Leu Asp Ala Ser Gly Glu Lys Met Asn Gly Ser His
 85 90 95
 agg gac caa ggc agc tcg gct ttg tca gga gtt gga ggc att cga ctt 336
 Arg Asp Gln Gly Ser Ser Ala Leu Ser Gly Val Gly Gly Ile Arg Leu
 100 105 110
 cct aac gga aaa cta aag tgt gat atc tgt ggg atc gtt tgc atc ggg 384
 Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly
 115 120 125
 ccc aat gtg ctc atg gtt cac aaa aga agt cat act ggt gaa cgg cct 432
 Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Glu Arg Pro
 130 135 140
 ttc cag tgc aac cag tct ggg gcc tcc ttt acc cag aaa ggc aac ctc 480
 Phe Gln Cys Asn Gln Ser Gly Ala Ser Phe Thr Gln Lys Gly Asn Leu
 145 150 155 160
 ctg cgg cac atc aag ctg cac tcg ggt gag aag ccc ttc aaa tgc cat 528
 Leu Arg His Ile Lys Leu His Ser Gly Glu Lys Pro Phe Lys Cys His

	165	170	175	
ctt tgc aac tat gcc tgc cgc cgg agg gac gcc ctc acc ggc cac ctg				576
Leu Cys Asn Tyr Ala Cys Arg Arg Arg Asp Ala Leu Thr Gly His Leu				
	180	185	190	
agg acg cac tcc gga gac aag tgc ctg tca gac atg ccc tat gac agt				624
Arg Thr His Ser Gly Asp Lys Cys Leu Ser Asp Met Pro Tyr Asp Ser				
	195	200	205	
gcc aac tat gag aag gag gat atg atg aca tcc cac gtg atg gac cag				672
Ala Asn Tyr Glu Lys Glu Asp Met Met Thr Ser His Val Met Asp Gln				
	210	215	220	
gcc atc aac aat gcc atc aac tac ctg ggg gct gag tcc ctg cgc cca				720
Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu Arg Pro				
	225	230	235	240
ttg gtg cag aca ccc ccc ggt agc tcc gag gtg gtg cca gtc atc agc				768
Leu Val Gln Thr Pro Pro Gly Ser Ser Glu Val Val Pro Val Ile Ser				
	245	250	255	
tcc atg tac cag ctg cac aag ccc ccc tca gat ggc ccc cca cgg tcc				816
Ser Met Tyr Gln Leu His Lys Pro Pro Ser Asp Gly Pro Pro Arg Ser				
	260	265	270	
aac cat tca gca cag gac gcc gtg gat aac ttg ctg ctg ctg tcc aag				864
Asn His Ser Ala Gln Asp Ala Val Asp Asn Leu Leu Leu Leu Ser Lys				
	275	280	285	
gcc aag tct gtg tca tcg gag cga gag gcc tcc ccg agc aac agc tgc				912
Ala Lys Ser Val Ser Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser Cys				
	290	295	300	
caa gac tcc aca gat aca gag agc aac gcg gag gaa cag cgc agc ggc				960
Gln Asp Ser Thr Asp Thr Glu Ser Asn Ala Glu Glu Gln Arg Ser Gly				
	305	310	315	320
ctt atc tac cta acc aac cac atc aac ccg cat gca cgc aat ggg ctg				1008
Leu Ile Tyr Leu Thr Asn His Ile Asn Pro His Ala Arg Asn Gly Leu				
	325	330	335	
gct ctc aag gag gag cag cgc gcc tac gag gtg ctg agg gcg gcc tca				1056
Ala Leu Lys Glu Glu Gln Arg Ala Tyr Glu Val Leu Arg Ala Ala Ser				
	340	345	350	
gag aac tcg cag gat gcc ttc cgt gtg gtc agc acg agt ggc gag cag				1104
Glu Asn Ser Gln Asp Ala Phe Arg Val Val Ser Thr Ser Gly Glu Gln				
	355	360	365	
ctg aag gtg tac aag tgc gaa cac tgc cgc gtg ctc ttc ctg gat cac				1152
Leu Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu Asp His				
	370	375	380	
gtc atg tat acc att cac atg ggc tgc cat ggc tgc cat ggc ttt cgg				1200
Val Met Tyr Thr Ile His Met Gly Cys His Gly Cys His Gly Phe Arg				
	385	390	395	400

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Asp	Pro	Phe	Glu	Cys	Asn	Met	Cys	Gly	Tyr	His	Ser	Gln	Asp	Arg	Tyr	
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gag	ttc	tca	tcc	cat	atc	acg	cgg	ggg	gag	cat	cgt	tac	cac	ctg	agc	1296
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<222> (223) ... (1776)

<223> mIk-1

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ccactcagag	gggactcaga	gcaagtctag	atttgtgtgg	cagagagaga	cagctctcgt	180
ttggccttgg	ggaggcacia	gtctgttgat	aacctgaaga	ca atg gat gtc gat		234
				Met Asp Val Asp		
				1		

gag	ggt	caa	gac	atg	tcc	caa	gtt	tca	gga	aag	gag	agc	ccc	cca	gtc	282
Glu	Gly	Gln	Asp	Met	Ser	Gln	Val	Ser	Gly	Lys	Glu	Ser	Pro	Pro	Val	
5					10					15					20	

agt	gac	act	cca	gat	gaa	ggg	gat	gag	ccc	atg	cct	gtc	cct	gag	gac	330
Ser	Asp	Thr	Pro	Asp	Glu	Gly	Asp	Glu	Pro	Met	Pro	Val	Pro	Glu	Asp	
			25					30						35		

ctg	tcc	act	acc	tct	gga	gca	cag	cag	aac	tcc	aag	agt	gat	cga	ggc	378
Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys	Ser	Asp	Arg	Gly	
			40					45						50		

atg	gcc	agt	aat	gtt	aaa	gta	gag	act	cag	agt	gat	gaa	gag	aat	ggg	426
Met	Ala	Ser	Asn	Val	Lys	Val	Glu	Thr	Gln	Ser	Asp	Glu	Glu	Asn	Gly	
		55					60					65				

cgt	gcc	tgt	gaa	atg	aat	ggg	gaa	gaa	tgt	gca	gag	gat	tta	cga	atg	474
Arg	Ala	Cys	Glu	Met	Asn	Gly	Glu	Glu	Cys	Ala	Glu	Asp	Leu	Arg	Met	
	70					75						80				

ctt	gat	gcc	tcg	gga	gag	aaa	atg	aat	ggc	tcc	cac	agg	gac	caa	ggc	522
Leu	Asp	Ala	Ser	Gly	Glu	Lys	Met	Asn	Gly	Ser	His	Arg	Asp	Gln	Gly	
85					90					95					100	

agc	tcg	gct	ttg	tca	gga	gtt	gga	ggc	att	cga	ctt	cct	aac	gga	aaa	570
Ser	Ser	Ala	Leu	Ser	Gly	Val	Gly	Gly	Ile	Arg	Leu	Pro	Asn	Gly	Lys	
				105					110					115		

cta	aag	tgt	gat	atc	tgt	ggg	atc	gtt	tgc	atc	ggg	ccc	aat	gtg	ctc	618
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Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly Pro Asn Val Leu	
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Met Val His Lys Arg Ser His Thr Gly Glu Arg Pro Phe Gln Cys Asn	
135 140 145	
cag tct ggg gcc tcc ttt acc cag aaa ggc aac ctc ctg cgg cac atc	714
Gln Ser Gly Ala Ser Phe Thr Gln Lys Gly Asn Leu Leu Arg His Ile	
150 155 160	
aag ctg cac tcg ggt gag aag ccc ttc aaa tgc cat ctt tgc aac tat	762
Lys Leu His Ser Gly Glu Lys Pro Phe Lys Cys His Leu Cys Asn Tyr	
165 170 175 180	
gcc tgc cgc cgg agg gac gcc ctc acc ggc cac ctg agg acg cac tcc	810
Ala Cys Arg Arg Arg Asp Ala Leu Thr Gly His Leu Arg Thr His Ser	
185 190 195	
gtt ggt aag cct cac aaa tgt gga tat tgt ggc cgg agc tat aaa cag	858
Val Gly Lys Pro His Lys Cys Gly Tyr Cys Gly Arg Ser Tyr Lys Gln	
200 205 210	
cga agc tct tta gag gag cat aaa gag cga tgc cac aac tac ttg gaa	906
Arg Ser Ser Leu Glu Glu His Lys Glu Arg Cys His Asn Tyr Leu Glu	
215 220 225	
agc atg ggc ctt ccg ggc gtg tgc cca gtc att aag gaa gaa act aac	954
Ser Met Gly Leu Pro Gly Val Cys Pro Val Ile Lys Glu Glu Thr Asn	
230 235 240	
cac aac gag atg gca gaa gac ctg tgc aag ata gga gca gag agg tcc	1002
His Asn Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ala Glu Arg Ser	
245 250 255 260	
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Leu Val Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser	
265 270 275	
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Met Pro Gln Lys Phe Leu Gly Asp Lys Cys Leu Ser Asp Met Pro Tyr	
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gac agt gcc aac tat gag aag gag gat atg atg aca tcc cac gtg atg	1146
Asp Ser Ala Asn Tyr Glu Lys Glu Asp Met Met Thr Ser His Val Met	
295 300 305	
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Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu	
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Arg Pro Leu Val Gln Thr Pro Pro Gly Ser Ser Glu Val Val Pro Val	
325 330 335 340	
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Ile Ser Ser Met Tyr Gln Leu His Lys Pro Pro Ser Asp Gly Pro Pro	

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Arg Ser Asn His Ser Ala Gln Asp Ala Val Asp Asn Leu Leu Leu Leu			
360	365	370	
tcc aag gcc aag tct gtg tca tcg gag cga gag gcc tcc ccg agc aac			1386
Ser Lys Ala Lys Ser Val Ser Ser Glu Arg Glu Ala Ser Pro Ser Asn			
375	380	385	
agc tgc caa gac tcc aca gat aca gag agc aac gcg gag gaa cag cgc			1434
Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Ala Glu Glu Gln Arg			
390	395	400	
agc ggc ctt atc tac cta acc aac cac atc aac ccg cat gca cgc aat			1482
Ser Gly Leu Ile Tyr Leu Thr Asn His Ile Asn Pro His Ala Arg Asn			
405	410	415	420
ggg ctg gct ctc aag gag gag cag cgc gcc tac gag gtg ctg agg gcg			1530
Gly Leu Ala Leu Lys Glu Glu Gln Arg Ala Tyr Glu Val Leu Arg Ala			
425	430	435	
gcc tca gag aac tcg cag gat gcc ttc cgt gtg gtc agc acg agt ggc			1578
Ala Ser Glu Asn Ser Gln Asp Ala Phe Arg Val Val Ser Thr Ser Gly			
440	445	450	
gag cag ctg aag gtg tac aag tgc gaa cac tgc cgc gtg ctc ttc ctg			1626
Glu Gln Leu Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu			
455	460	465	
gat cac gtc atg tat acc att cac atg ggc tgc cat ggc tgc cat ggc			1674
Asp His Val Met Tyr Thr Ile His Met Gly Cys His Gly Cys His Gly			
470	475	480	
ttt cgg gat ccc ttt gag tgt aac atg tgt ggt tat cac agc cag gac			1722
Phe Arg Asp Pro Phe Glu Cys Asn Met Cys Gly Tyr His Ser Gln Asp			
485	490	495	500
agg tac gag ttc tca tcc cat atc acg cgg ggg gag cat cgt tac cac			1770
Arg Tyr Glu Phe Ser Ser His Ile Thr Arg Gly Glu His Arg Tyr His			
505	510	515	
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Leu Ser			
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acaggattgc attgcatcag caacattcac aacatccatc cttctagcca gttttgttca			2006
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 Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro
 20 25 30

gtc cct gag gac ctg tcc act acc tct gga gca cag cag aac tcc aag 144
Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys
35 40 45

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 Ser Asp Arg Gly Met Gly Glu Arg Pro Phe Gln Cys Asn Gln Ser Gly
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Ala Ser Phe Thr Gln Lys Gly Asn Leu Leu Arg His Ile Lys Leu His
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Ser Gly Glu Lys Pro Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg
85 90 95

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Arg Arg Asp Ala Leu Thr Gly His Leu Arg Thr His Ser Val Ile Lys
100 105 110

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Glu Glu Thr Asn His Asn Glu Met Ala Glu Asp Leu Cys Lys Ile Gly
115 120 125

gca gag agg tcc ctt gtc ctg gac agg ctg gca agc aat gtc gcc aaa 432
Ala Glu Arg Ser Leu Val Leu Asp Arg Leu Ala Ser Asn Val Ala Lys
130 135 140

cgt aag agc tct atg cct cag aaa ttt ctt gga gac aag tgc ctg tca 480
Arg Lys Ser Ser Met Pro Gln Lys Phe Leu Gly Asp Lys Cys Leu Ser
145 150 155 160

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Asp Met Pro Tyr Asp Ser Ala Asn Tyr Glu Lys Glu Asp Met Met Thr
165 170 175

tcc cac gtg atg gac cag gcc atc aac aat gcc atc aac tac ctg ggg 576
Ser His Val Met Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly
180 185 190

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Ala Glu Ser Leu Arg Pro Leu Val Gln Thr Pro Pro Gly Ser Ser Glu
195 200 205

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 Val Val Pro Val Ile Ser Ser Met Tyr Gln Leu His Lys Pro Pro Ser
 210 215 220

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 Asp Gly Pro Pro Arg Ser Asn His Ser Ala Gln Asp Ala Val Asp Asn
 225 230 235 240

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 Leu Leu Leu Leu Ser Lys Ala Lys Ser Val Ser Ser Glu Arg Glu Ala
 245 250 255

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 Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Ala
 260 265 270

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 Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr Asn His Ile Asn Pro
 275 280 285

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 His Ala Arg Asn Gly Leu Ala Leu Lys Glu Glu Gln Arg Ala Tyr Glu
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 305 310 315 320

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 Ser Thr Ser Gly Glu Gln Leu Lys Val Tyr Lys Cys Glu His Cys Arg
 325 330 335

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 340 345 350

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 Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys Asn Met Cys Gly Tyr
 355 360 365

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Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro	
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gtc cct gag gac ctg tcc act acc tct gga gca cag cag aac tcc aag	144
Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys	
35 40 45	
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Ser Asp Arg Gly Met Ala Ser Asn Val Lys Val Glu Thr Gln Ser Asp	
50 55 60	
gaa gag aat ggg cgt gcc tgt gaa atg aat ggg gaa gaa tgt gca gag	240
Glu Glu Asn Gly Arg Ala Cys Glu Met Asn Gly Glu Glu Cys Ala Glu	
65 70 75 80	
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Asp Leu Arg Met Leu Asp Ala Ser Gly Glu Lys Met Asn Gly Ser His	
85 90 95	
agg gac caa ggc agc tcg gct ttg tca gga gtt gga ggc att cga ctt	336
Arg Asp Gln Gly Ser Ser Ala Leu Ser Gly Val Gly Gly Ile Arg Leu	
100 105 110	
cct aac gga aaa cta aag tgt gat atc tgt ggg atc gtt tgc atc ggg	384
Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly	
115 120 125	
ccc aat gtg ctc atg gtt cac aaa aga agt cat act gga gac aag tgc	432
Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Asp Lys Cys	
130 135 140	
ctg tca gac atg ccc tat gac agt gcc aac tat gag aag gag gat atg	480
Leu Ser Asp Met Pro Tyr Asp Ser Ala Asn Tyr Glu Lys Glu Asp Met	
145 150 155 160	
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Met Thr Ser His Val Met Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr	
165 170 175	
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Leu Gly Ala Glu Ser Leu Arg Pro Leu Val Gln Thr Pro Pro Gly Ser	
180 185 190	
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Ser Glu Val Val Pro Val Ile Ser Ser Met Tyr Gln Leu His Lys Pro	
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Pro Ser Asp Gly Pro Pro Arg Ser Asn His Ser Ala Gln Asp Ala Val	

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Asp Asn Leu Leu Leu Leu Ser Lys Ala Lys Ser Val Ser Ser Glu Arg			
225	230	235	240
gag gcc tcc ccg agc aac agc tgc caa gac tcc aca gat aca gag agc			768
Glu Ala Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser			
245	250		255
aac gcg gag gaa cag cgc agc ggc ctt atc tac cta acc aac cac atc			816
Asn Ala Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr Asn His Ile			
260	265		270
aac ccg cat gca cgc aat ggg ctg gct ctc aag gag gag cag cgc gcc			864
Asn Pro His Ala Arg Asn Gly Leu Ala Leu Lys Glu Glu Gln Arg Ala			
275	280		285
tac gag gtg ctg agg gcg gcc tca gag aac tcg cag gat gcc ttc cgt			912
Tyr Glu Val Leu Arg Ala Ala Ser Glu Asn Ser Gln Asp Ala Phe Arg			
290	295		300
gtg gtc agc acg agt ggc gag cag ctg aag gtg tac aag tgc gaa cac			960
Val Val Ser Thr Ser Gly Glu Gln Leu Lys Val Tyr Lys Cys Glu His			
305	310		315
tgc cgc gtg ctc ttc ctg gat cac gtc atg tat acc att cac atg ggc			1008
Cys Arg Val Leu Phe Leu Asp His Val Met Tyr Thr Ile His Met Gly			
325	330		335
tgc cat ggc tgc cat ggc ttt cgg gat ccc ttt gag tgt aac atg tgt			1056
Cys His Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys Asn Met Cys			
340	345		350
ggg tat cac agc cag gac agg tac gag ttc tca tcc cat atc acg cgg			1104
Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser Ser His Ile Thr Arg			
355	360		365
ggg gag cat cgt tac cac ctg agc			1128
Gly Glu His Arg Tyr His Leu Ser			
370	375		

<210> 7

<211> 1004

<212> DNA

<213> Mus musculus

<220>

<221> CDS

<222> (1)...(1005)

<400> 7

gga gaa cgg ccc ttc cag tgc aat cag tgc ggg gcc tca ttc acc cag	48
Gly Glu Arg Pro Phe Gln Cys Asn Gln Cys Gly Ala Ser Phe Thr Gln	
1	5
	10
	15

aag ggc aac ctg ctc cgg cac atc aag ctg cat tcc ggg gag aag ccc	96
Lys Gly Asn Leu Leu Arg His Ile Lys Leu His Ser Gly Glu Lys Pro	
20 25 30	
ttc aaa tgc cac ctc tgc aac tac gcc tgc cgc cgg agg gac gcc ctc	144
Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg Arg Arg Asp Ala Leu	
35 40 45	
act ggc cac ctg agg acg cac tcc gtc att aaa gaa gaa act aag cac	192
Thr Gly His Leu Arg Thr His Ser Val Ile Lys Glu Glu Thr Lys His	
50 55 60	
agt gaa atg gca gaa gac ctg tgc aag ata gga tca gag aga tct ctc	240
Ser Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ser Glu Arg Ser Leu	
65 70 75 80	
gtg ctg gac aga cta gca agt aat gtc gcc aaa cgt aag agc tct atg	288
Val Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met	
85 90 95	
cct cag aaa ttt ctt ggg gac aag ggc ctg tcc gac acg ccc tac gac	336
Pro Gln Lys Phe Leu Gly Asp Lys Gly Leu Ser Asp Thr Pro Tyr Asp	
100 105 110	
agt gcc acg tac gag aag gag aac gaa atg atg aag tcc cac gtg atg	384
Ser Ala Thr Tyr Glu Lys Glu Asn Glu Met Met Lys Ser His Val Met	
115 120 125	
gac caa gcc atc aac aac gcc atc aac tac ctg ggg gcc gag tcc ctg	432
Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu	
130 135 140	
cgc ccg ctg gtg cag acg ccc ccg ggc ggt tcc gag gtg gtc ccg gtc	480
Arg Pro Leu Val Gln Thr Pro Pro Gly Gly Ser Glu Val Val Pro Val	
145 150 155 160	
atc agc ccg atg tac cag ctg cac agg cgc tcg gag ggc acc ccg cgc	528
Ile Ser Pro Met Tyr Gln Leu His Arg Arg Ser Glu Gly Thr Pro Arg	
165 170 175	
tcc aac cac tcg gcc cag gac agc gcc gtg gag tac ctg ctg ctg ctc	576
Ser Asn His Ser Ala Gln Asp Ser Ala Val Glu Tyr Leu Leu Leu Leu	
180 185 190	
tcc aag gcc aag ttg gtg ccc tcg gag cgc gag gcg tcc ccg agc aac	624
Ser Lys Ala Lys Leu Val Pro Ser Glu Arg Glu Ala Ser Pro Ser Asn	
195 200 205	
agc tgc caa gac tcc acg gac acc gag agc aac aac gag gag cag cgc	672
Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Asn Glu Glu Gln Arg	
210 215 220	
agc ggt ctt atc tac ctg acc aac cac atc gcc cga cgc gcg caa cgc	720
Ser Gly Leu Ile Tyr Leu Thr Asn His Ile Ala Arg Arg Ala Gln Arg	
225 230 235 240	
gtg tcg ctc aag gag gag cac cgc gcc tac gac ctg ctg cgc gcc gcc	768

Val	Ser	Leu	Lys	Glu	His	Arg	Ala	Tyr	Asp	Leu	Leu	Arg	Ala	Ala			
				245				250					255				
tcc	gag	aac	tcg	cag	gac	gcg	ctc	cgc	gtg	gtc	agc	acc	agc	ggg	gag		816
Ser	Glu	Asn	Ser	Gln	Asp	Ala	Leu	Arg	Val	Val	Ser	Thr	Ser	Gly	Glu		
			260					265					270				
cag	atg	aag	gtg	tac	aag	tgc	gaa	cac	tgc	cgg	gtg	ctc	ttc	ctg	gat		864
Gln	Met	Lys	Val	Tyr	Lys	Cys	Glu	His	Cys	Arg	Val	Leu	Phe	Leu	Asp		
			275					280					285				
cac	gtc	atg	tac	acc	atc	cac	atg	ggc	tgc	cac	ggc	ttc	cgt	gat	cct		912
His	Val	Met	Tyr	Thr	Ile	His	Met	Gly	Cys	His	Gly	Phe	Arg	Asp	Pro		
			290					295				300					
ttt	gag	tgc	aac	atg	tgc	ggc	tac	cac	agc	cag	gac	cgg	tac	gag	ttc		960
Phe	Glu	Cys	Asn	Met	Cys	Gly	Tyr	His	Ser	Gln	Asp	Arg	Tyr	Glu	Phe		
305						310				315					320		
tcg	tcg	cac	ata	acg	cga	ggg	gag	cac	cgc	ttc	cac	atg	agc	ta			1004
Ser	Ser	His	Ile	Thr	Arg	Gly	Glu	His	Arg	Phe	His	Met	Ser	Ser			
				325					330					335			
<210> 8																	
<211> 103																	
<212> DNA																	
<213> Mus musculus																	
<400> 8																	
tttgggttata	aatgtattga	ttgcatcccc	attaccacaga	aggccaatat	ttaattggag												60
tcttaactca	atttgtgtttt	cgtcagttgg	taagcctcac	aaa													103
<210> 9																	
<211> 116																	
<212> DNA																	
<213> Mus musculus																	
<400> 9																	
atggggccttc	cgggcatgta	cccaggttaag	cactgaggcc	ctgctgagct	gcacccctcc												60
ccctcccagc	gctgtggcca	ggatggggct	ctgtggcctg	tttcagccac	aggagg												116
<210> 10																	
<211> 94																	
<212> DNA																	
<213> Mus musculus																	
<400> 10																	
ccttggttgct	gctgtgttgc	tatcttgtga	cttatttttg	cagtgcacct	gagtggcctc												60
ctgtgttgct	tctttcagcc	agtaatgtta	aagt														94
<210> 11																	
<211> 120																	
<212> DNA																	
<213> Mus musculus																	
<400> 11																	

gagccctggc agatgtgtcc tgtctgtgtg gacactagaa caccattcaa cccctgggtg 60
tagatttcac ttatgaccat ctacttcccg caggagacaa gtgcctgtca gacatgccct 120

<210> 12

<211> 120

<212> DNA

<213> Mus musculus

<400> 12

acatgtgtgg ttatcacagc caggacaggt acgagttctc atcccatatc acgcgggggg 60
agcatcgta ccactgagc taaaccagc caggccccac tgaagcaca agatagctgg 120

<210> 13

<211> 470

<212> PRT

<213> Artificial Sequence

<220>

<223> consensus sequence

<221> VARIANT

<222> (1)...(470)

<223> Xaa = Any Amino Acid

<400> 13

Xaa	Xaa	Ala	Ser	Asn	Val	Lys	Val	Glu	Thr	Gln	Ser	Asp	Glu	Glu	Asn
1				5				10					15		
Gly	Arg	Ala	Cys	Glu	Met	Asn	Gly	Glu	Glu	Cys	Ala	Glu	Asp	Leu	Arg
		20						25				30			
Met	Leu	Asp	Ala	Ser	Gly	Glu	Lys	Met	Asn	Gly	Ser	His	Arg	Asp	Gln
		35					40					45			
Gly	Ser	Ser	Ala	Leu	Ser	Gly	Val	Gly	Gly	Ile	Arg	Leu	Pro	Asn	Gly
	50					55					60				
Lys	Leu	Lys	Cys	Asp	Ile	Cys	Gly	Ile	Xaa	Cys	Ile	Gly	Pro	Asn	Val
65				70					75					80	
Leu	Met	Val	His	Lys	Arg	Ser	His	Thr	Gly	Glu	Arg	Pro	Phe	Gln	Cys
			85					90						95	
Asn	Gln	Cys	Gly	Ala	Ser	Phe	Thr	Gln	Lys	Gly	Asn	Leu	Leu	Arg	His
		100						105				110			
Ile	Lys	Leu	His	Ser	Gly	Glu	Lys	Pro	Phe	Lys	Cys	His	Leu	Cys	Asn
	115					120					125				
Tyr	Ala	Cys	Arg	Arg	Arg	Asp	Ala	Leu	Thr	Gly	His	Leu	Arg	Thr	His
	130					135					140				
Ser	Val	Gly	Lys	Pro	His	Lys	Cys	Gly	Tyr	Cys	Gly	Arg	Ser	Tyr	Lys
145				150					155					160	
Gln	Arg	Xaa	Ser	Leu	Glu	Glu	His	Lys	Glu	Arg	Cys	His	Asn	Tyr	Leu
			165					170						175	
Glu	Ser	Met	Gly	Leu	Pro	Gly	Xaa	Xaa	Xaa	Pro	Val	Ile	Lys	Glu	Glu
		180					185						190		
Thr	Xaa	His	Xaa	Glu	Met	Ala	Glu	Asp	Leu	Cys	Lys	Ile	Gly	Xaa	Glu
	195					200						205			
Arg	Ser	Leu	Val	Leu	Asp	Arg	Leu	Ala	Ser	Asn	Val	Ala	Lys	Arg	Lys
	210				215						220				
Ser	Ser	Met	Pro	Gln	Lys	Phe	Leu	Gly	Asp	Lys	Xaa	Leu	Ser	Asp	Xaa
225				230					235					240	
Pro	Tyr	Asp	Ser	Ala	Xaa	Tyr	Glu	Lys	Glu	Xaa	Xaa	Met	Met	Xaa	Ser
			245				250							255	

His Val Met Asp Xaa Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala
 260 265 270
 Glu Ser Leu Arg Pro Leu Val Gln Thr Pro Pro Gly Xaa Ser Glu Val
 275 280 285
 Val Pro Val Ile Ser Pro Met Tyr Gln Leu His Xaa Xaa Xaa Ser Xaa
 290 295 300
 Gly Xaa Pro Arg Ser Asn His Ser Ala Gln Asp Xaa Ala Val Xaa Xaa
 305 310 315 320
 Leu Leu Leu Leu Ser Lys Ala Lys Xaa Val Xaa Ser Glu Arg Glu Ala
 325 330 335
 Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Xaa
 340 345 350
 Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr Asn His Ile Xaa Xaa
 355 360 365
 Xaa Ala Xaa Xaa Xaa Xaa Xaa Leu Lys Glu Glu Xaa Arg Ala Tyr Xaa
 370 375 380
 Xaa Leu Arg Ala Ala Ser Glu Asn Ser Gln Asp Ala Xaa Arg Val Val
 385 390 395 400
 Ser Thr Ser Gly Glu Gln Xaa Lys Val Tyr Lys Cys Glu His Cys Arg
 405 410 415
 Val Leu Phe Leu Asp His Val Met Tyr Thr Ile His Met Xaa Xaa Xaa
 420 425 430
 Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys Asn Met Cys Gly Tyr
 435 440 445
 His Ser Gln Asp Arg Tyr Glu Phe Ser Ser His Ile Thr Arg Gly Glu
 450 455 460
 His Arg Xaa His Xaa Ser
 465 470

<210> 14
 <211> 38
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> probe

<400> 14
 agaagtttcc ataagatgat gaatgggggt ggcagaga

38

<210> 15
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 15
 ggctgccacg gcttccgtga tcct

24

<210> 16
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 16

agcgggtctgg ggaaacatct agga

24

<210> 17

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 17

agtaatgtta aagtagagac tcag

24

<210> 18

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 18

gtatgacttc ttttgtgaac catg

24

<210> 19

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 19

ccagcctctg agcccagaaa gcga

24

<210> 20

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 20

cactacctct ggagcacagc agaa

24

<210> 21

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetically generated primer

<400> 21
ggtgaacggc ctttccagtg c

21

<210> 22
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetically generated primer

<400> 22
tctgaggcat agagctctta c

21

<210> 23
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetically generated primer

<400> 23
catagggcat gtctgacagg cact

24

<210> 24
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetically generated primer

<400> 24
tcagcttttg ggaatgtatt ccctgtca

28

<210> 25
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetically generated primer

<400> 25
tcagcttttg agaataccct gtca

24

<210> 26
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetically generated primer

<400> 26
ggcatgactc agagcga

17

TOP SECRET

<210> 27
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 27
 ccttcacatctg gagtggtcact gactg 25

<210> 28
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 28
 ctgaaacttg ggacatgtct tg 22

<210> 29
 <211> 30
 <212> DNA
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<220>
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<400> 29
 aaaggatccg aacataacta tggatcagcc 30

<210> 30
 <211> 29
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 30
 tttaccggtg tcttcaggtt atctcctgc 29

<210> 31
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
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<400> 31
 cgtaaaggcc acaagttca 19

<210> 32

<211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 32
 cttgaagttc accttgatgc 20

<210> 33
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
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<400> 33
 tcgacgatcg atcgatcgat cataacttcg tataatgtat gctatacgaa gttattaagc 60
 tt 62

<210> 34
 <211> 41
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 34
 gatccataac ttcgtataat gtatgctata cgaagttatt t 41

<210> 35
 <211> 46
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> synthetically generated primer

<400> 35
 ctagaaataa ottcgtatag catacattat acgaagttat ggatcc 46

<210> 36
 <211> 21
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> exemplary motif

<221> VARIANT
 <222> (1)...(21)
 <223> Xaa = Any Amino Acid

<400> 36

Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15
 His Xaa Xaa Xaa His
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<210> 37

<211> 431

<212> PRT

<213> Mus musculus

<400> 37

Met Asp Val Asp Glu Gly Gln Asp Met Ser Gln Val Ser Gly Lys Glu
 1 5 10 15
 Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro
 20 25 30
 Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys
 35 40 45
 Ser Asp Arg Gly Met Gly Gln Arg Pro Phe Gln Cys Asn Gln Ser Gly
 50 55 60
 Ala Ser Phe Thr Gln Lys Gly Asn Leu Leu Arg His Ile Lys Leu His
 65 70 75 80
 Ser Gly Glu Lys Pro Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg
 85 90 95
 Arg Arg Asp Ala Leu Thr Gly His Leu Arg Thr His Ser Val Gly Lys
 100 105 110
 Pro His Lys Cys Gly Tyr Cys Gly Arg Ser Tyr Lys Gln Arg Ser Ser
 115 120 125
 Leu Glu Glu His Lys Glu Arg Cys His Asn Tyr Leu Glu Ser Met Gly
 130 135 140
 Leu Pro Gly Val Cys Pro Val Ile Lys Glu Glu Thr Asn His Asn Glu
 145 150 155 160
 Met Ala Glu Asp Leu Cys Lys Ile Gly Ala Glu Arg Ser Leu Val Leu
 165 170 175
 Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met Pro Gln
 180 185 190
 Lys Phe Leu Gly Asp Lys Cys Leu Ser Asp Met Pro Tyr Asp Ser Ala
 195 200 205
 Asn Tyr Glu Lys Glu Asp Met Met Thr Ser His Val Met Asp Gln Ala
 210 215 220
 Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu Arg Pro Leu
 225 230 235 240
 Val Gln Thr Pro Pro Gly Ser Ser Glu Val Val Pro Val Ile Ser Ser
 245 250 255
 Met Tyr Gln Leu His Lys Pro Pro Ser Asp Gly Pro Pro Arg Ser Asn
 260 265 270
 His Ser Ala Gln Asp Ala Val Asp Asn Leu Leu Leu Leu Ser Lys Ala
 275 280 285
 Lys Ser Val Ser Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser Cys Gln
 290 295 300
 Asp Ser Thr Asp Thr Glu Ser Asn Ala Glu Glu Gln Arg Ser Gly Leu
 305 310 315 320
 Ile Tyr Leu Thr Asn His Ile Asn Pro His Ala Arg Asn Gly Leu Ala
 325 330 335
 Leu Lys Glu Glu Gln Arg Ala Tyr Glu Val Leu Arg Ala Ala Ser Glu
 340 345 350
 Asn Ser Gln Asp Ala Phe Arg Val Val Ser Thr Ser Gly Glu Gln Leu
 355 360 365

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Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu Asp His Val
 370 375 380
 Met Tyr Thr Ile His Met Gly Cys His Gly Cys His Gly Phe Arg Asp
 385 390 395 400
 Pro Phe Glu Cys Asn Met Cys Gly Tyr His Ser Gln Asp Arg Tyr Glu
 405 410 415
 Phe Ser Ser His Ile Thr Arg Gly Glu His Arg Tyr His Leu Ser
 420 425 430

<210> 38

<211> 461

<212> PRT

<213> Homo sapiens

<400> 38

Asn Val Lys Val Glu Thr Gln Ser Asp Glu Glu Asn Gly Arg Ala Cys
 1 5 10 15
 Glu Met Asn Gly Glu Glu Cys Ala Glu Asp Leu Arg Met Leu Asp Ala
 20 25 30
 Ser Gly Glu Lys Met Asn Gly Ser His Arg Asp Gln Gly Ser Ser Ala
 35 40 45
 Leu Ser Gly Val Gly Gly Ile Arg Leu Pro Asn Gly Lys Leu Lys Cys
 50 55 60
 Asp Ile Cys Gly Ile Ile Cys Ile Gly Pro Asn Val Leu Met Val His
 65 70 75 80
 Lys Arg Ser His Thr Gly Glu Arg Pro Phe Gln Cys Asn Gln Cys Gly
 85 90 95
 Ala Ser Phe Thr Gln Lys Gly Asn Leu Leu Arg His Ile Lys Leu His
 100 105 110
 Ser Gly Glu Lys Pro Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg
 115 120 125
 Arg Arg Asp Ala Leu Thr Gly His Leu Arg Thr His Ser Val Gly Lys
 130 135 140
 Pro His Lys Cys Gly Tyr Cys Gly Arg Ser Tyr Lys Gln Arg Thr Ser
 145 150 155 160
 Leu Glu Glu His Lys Glu Arg Cys His Asn Tyr Leu Glu Ser Met Gly
 165 170 175
 Leu Pro Gly Thr Leu Tyr Pro Val Ile Lys Glu Glu Thr Lys His Ser
 180 185 190
 Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ser Glu Arg Ser Leu Val
 195 200 205
 Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met Pro
 210 215 220
 Gln Lys Phe Leu Gly Asp Lys Gly Leu Ser Asp Thr Pro Tyr Asp Ser
 225 230 235 240
 Ala Thr Tyr Glu Lys Glu Asn Glu Met Met Lys Ser His Val Met Asp
 245 250 255
 Gln Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu Arg
 260 265 270
 Pro Leu Val Gln Thr Pro Pro Gly Ser Glu Val Val Pro Val Ile
 275 280 285
 Ser Pro Met Tyr Gln Leu His Arg Arg Ser Glu Gly Thr Pro Arg Ser
 290 295 300
 Asn His Ser Ala Gln Asp Ser Ala Val Glu Tyr Leu Leu Leu Leu Ser
 305 310 315 320
 Lys Ala Lys Leu Val Pro Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser
 325 330 335

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Cys Gln Asp Ser Thr Asp Thr Glu Ser Asn Asn Glu Glu Gln Arg Ser
 340 345 350
 Gly Leu Ile Tyr Leu Thr Asn His Ile Ala Arg Arg Ala Gln Arg Val
 355 360 365
 Ser Leu Lys Glu Glu His Arg Ala Tyr Asp Leu Leu Arg Ala Ala Ser
 370 375 380
 Glu Asn Ser Gln Asp Ala Leu Arg Val Val Ser Thr Ser Gly Glu Gln
 385 390 395 400
 Met Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu Asp His
 405 410 415
 Val Met Tyr Thr Ile His Met Gly Cys His Gly Phe Arg Asp Pro Phe
 420 425 430
 Glu Cys Asn Met Cys Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser
 435 440 445
 Ser His Ile Thr Arg Gly Glu His Arg Phe His Met Ser
 450 455 460

<210> 39

<211> 432

<212> PRT

<213> Mus musculus

<400> 39

Met Asp Val Asp Glu Gly Gln Asp Met Ser Gln Val Ser Gly Lys Glu
 1 5 10 15
 Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro
 20 25 30
 Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys
 35 40 45
 Ser Asp Arg Gly Met Ala Ser Asn Val Lys Val Glu Thr Gln Ser Asp
 50 55 60
 Glu Glu Asn Gly Arg Ala Cys Glu Met Asn Gly Glu Glu Cys Ala Glu
 65 70 75 80
 Asp Leu Arg Met Leu Asp Ala Ser Gly Glu Lys Met Asn Gly Ser His
 85 90 95
 Arg Asp Gln Gly Ser Ser Ala Leu Ser Gly Val Gly Gly Ile Arg Leu
 100 105 110
 Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly
 115 120 125
 Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Glu Arg Pro
 130 135 140
 Phe Gln Cys Asn Gln Ser Gly Ala Ser Phe Thr Gln Lys Gly Asn Leu
 145 150 155 160
 Leu Arg His Ile Lys Leu His Ser Gly Glu Lys Pro Phe Lys Cys His
 165 170 175
 Leu Cys Asn Tyr Ala Cys Arg Arg Arg Asp Ala Leu Thr Gly His Leu
 180 185 190
 Arg Thr His Ser Gly Asp Lys Cys Leu Ser Asp Met Pro Tyr Asp Ser
 195 200 205
 Ala Asn Tyr Glu Lys Glu Asp Met Met Thr Ser His Val Met Asp Gln
 210 215 220
 Ala Ile Asn Asn Ala Ile Asn Tyr Leu Gly Ala Glu Ser Leu Arg Pro
 225 230 235 240
 Leu Val Gln Thr Pro Pro Gly Ser Ser Glu Val Val Pro Val Ile Ser
 245 250 255
 Ser Met Tyr Gln Leu His Lys Pro Pro Ser Asp Gly Pro Pro Arg Ser
 260 265 270

```

Asn His Ser Ala Gln Asp Ala Val Asp Asn Leu Leu Leu Leu Ser Lys
    275                      280                      285
Ala Lys Ser Val Ser Ser Glu Arg Glu Ala Ser Pro Ser Asn Ser Cys
    290                      295                      300
Gln Asp Ser Thr Asp Thr Glu Ser Asn Ala Glu Glu Gln Arg Ser Gly
305                      310                      315                      320
Leu Ile Tyr Leu Thr Asn His Ile Asn Pro His Ala Arg Asn Gly Leu
    325                      330                      335
Ala Leu Lys Glu Glu Gln Arg Ala Tyr Glu Val Leu Arg Ala Ala Ser
    340                      345                      350
Glu Asn Ser Gln Asp Ala Phe Arg Val Val Ser Thr Ser Gly Glu Gln
    355                      360                      365
Leu Lys Val Tyr Lys Cys Glu His Cys Arg Val Leu Phe Leu Asp His
    370                      375                      380
Val Met Tyr Thr Ile His Met Gly Cys His Gly Cys His Gly Phe Arg
385                      390                      395                      400
Asp Pro Phe Glu Cys Asn Met Cys Gly Tyr His Ser Gln Asp Arg Tyr
    405                      410                      415
Glu Phe Ser Ser His Ile Thr Arg Gly Glu His Arg Tyr His Leu Ser
    420                      425                      430

```

<210> 40

<211> 518

<212> PRT

<213> Mus musculus

<400> 40

```

Met Asp Val Asp Glu Gly Gln Asp Met Ser Gln Val Ser Gly Lys Glu
 1          5          10          15
Ser Pro Pro Val Ser Asp Thr Pro Asp Glu Gly Asp Glu Pro Met Pro
    20          25          30
Val Pro Glu Asp Leu Ser Thr Thr Ser Gly Ala Gln Gln Asn Ser Lys
    35          40          45
Ser Asp Arg Gly Met Ala Ser Asn Val Lys Val Glu Thr Gln Ser Asp
 50          55          60
Glu Glu Asn Gly Arg Ala Cys Glu Met Asn Gly Glu Glu Cys Ala Glu
65          70          75          80
Asp Leu Arg Met Leu Asp Ala Ser Gly Glu Lys Met Asn Gly Ser His
    85          90          95
Arg Asp Gln Gly Ser Ser Ala Leu Ser Gly Val Gly Gly Ile Arg Leu
    100          105          110
Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly
    115          120          125
Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Glu Arg Pro
    130          135          140
Phe Gln Cys Asn Gln Ser Gly Ala Ser Phe Thr Gln Lys Gly Asn Leu
145          150          155          160
Leu Arg His Ile Lys Leu His Ser Gly Glu Lys Pro Phe Lys Cys His
    165          170          175
Leu Cys Asn Tyr Ala Cys Arg Arg Arg Asp Ala Leu Thr Gly His Leu
    180          185          190
Arg Thr His Ser Val Gly Lys Pro His Lys Cys Gly Tyr Cys Gly Arg
    195          200          205
Ser Tyr Lys Gln Arg Ser Ser Leu Glu Glu His Lys Glu Arg Cys His
    210          215          220
Asn Tyr Leu Glu Ser Met Gly Leu Pro Gly Val Cys Pro Val Ile Lys
225          230          235          240

```

```
<210> 41
<211> 390
<212> PRT
<213> Mus musculus
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Met	Asp	Val	Asp	Glu	Gly	Gln	Asp	Met	Ser	Gln	Val	Ser	Gly	Lys	Glu
1				5					10					15	
Ser	Pro	Pro	Val	Ser	Asp	Thr	Pro	Asp	Glu	Gly	Asp	Glu	Pro	Met	Pro
			20					25					30		
Val	Pro	Glu	Asp	Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys
			35				40						45		
Ser	Asp	Arg	Gly	Met	Gly	Glu	Arg	Pro	Phe	Gln	Cys	Asn	Gln	Ser	Gly
			50			55					60				
Ala	Ser	Phe	Thr	Gln	Lys	Gly	Asn	Leu	Leu	Arg	His	Ile	Lys	Leu	His
65					70					75				80	
Ser	Gly	Glu	Lys	Pro	Phe	Lys	Cys	His	Leu	Cys	Asn	Tyr	Ala	Cys	Arg
				85					90					95	
Arg	Arg	Asp	Ala	Leu	Thr	Gly	His	Leu	Arg	Thr	His	Ser	Val	Ile	Lys
			100					105					110		

```
<210> 42
<211> 376
<212> PRT
<213> Mus musculus
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Met	Asp	Val	Asp	Glu	Gly	Gln	Asp	Met	Ser	Gln	Val	Ser	Gly	Lys	Glu
1				5					10					15	
Ser	Pro	Pro	Val	Ser	Asp	Thr	Pro	Asp	Glu	Gly	Asp	Glu	Pro	Met	Pro
			20					25					30		
Val	Pro	Glu	Asp	Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys
			35				40						45		
Ser	Asp	Arg	Gly	Met	Ala	Ser	Asn	Val	Lys	Val	Glu	Thr	Gln	Ser	Asp
			50				55					60			
Glu	Glu	Asn	Gly	Arg	Ala	Cys	Glu	Met	Asn	Gly	Glu	Glu	Cys	Ala	Glu
65					70					75					80
Asp	Leu	Arg	Met	Leu	Asp	Ala	Ser	Gly	Glu	Lys	Met	Asn	Gly	Ser	His
				85						90				95	
Arg	Asp	Gln	Gly	Ser	Ser	Ala	Leu	Ser	Gly	Val	Gly	Gly	Ile	Arg	Leu
			100					105					110		

Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly
 115 120 125
 Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Asp Lys Cys
 130 135 140
 Leu Ser Asp Met Pro Tyr Asp Ser Ala Asn Tyr Glu Lys Glu Asp Met
 145 150 155 160
 Met Thr Ser His Val Met Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr
 165 170 175
 Leu Gly Ala Glu Ser Leu Arg Pro Leu Val Gln Thr Pro Pro Gly Ser
 180 185 190
 Ser Glu Val Val Pro Val Ile Ser Ser Met Tyr Gln Leu His Lys Pro
 195 200 205
 Pro Ser Asp Gly Pro Pro Arg Ser Asn His Ser Ala Gln Asp Ala Val
 210 215 220
 Asp Asn Leu Leu Leu Leu Ser Lys Ala Lys Ser Val Ser Ser Glu Arg
 225 230 235 240
 Glu Ala Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser
 245 250 255
 Asn Ala Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr Asn His Ile
 260 265 270
 Asn Pro His Ala Arg Asn Gly Leu Ala Leu Lys Glu Glu Gln Arg Ala
 275 280 285
 Tyr Glu Val Leu Arg Ala Ala Ser Glu Asn Ser Gln Asp Ala Phe Arg
 290 295 300
 Val Val Ser Thr Ser Gly Glu Gln Leu Lys Val Tyr Lys Cys Glu His
 305 310 315 320
 Cys Arg Val Leu Phe Leu Asp His Val Met Tyr Thr Ile His Met Gly
 325 330 335
 Cys His Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys Asn Met Cys
 340 345 350
 Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser Ser His Ile Thr Arg
 355 360 365
 Gly Glu His Arg Tyr His Leu Ser
 370 375

<210> 43

<211> 334

<212> PRT

<213> Mus musculus

<400> 43

Gly Glu Arg Pro Phe Gln Cys Asn Gln Cys Gly Ala Ser Phe Thr Gln
 1 5 10 15
 Lys Gly Asn Leu Leu Arg His Ile Lys Leu His Ser Gly Glu Lys Pro
 20 25 30
 Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg Arg Arg Asp Ala Leu
 35 40 45
 Thr Gly His Leu Arg Thr His Ser Val Ile Lys Glu Glu Thr Lys His
 50 55 60
 Ser Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ser Glu Arg Ser Leu
 65 70 75 80
 Val Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met
 85 90 95
 Pro Gln Lys Phe Leu Gly Asp Lys Gly Leu Ser Asp Thr Pro Tyr Asp
 100 105 110
 Ser Ala Thr Tyr Glu Lys Glu Asn Glu Met Met Lys Ser His Val Met
 115 120 125

Asp	Gln	Ala	Ile	Asn	Asn	Ala	Ile	Asn	Tyr	Leu	Gly	Ala	Glu	Ser	Leu
130						135					140				
Arg	Pro	Leu	Val	Gln	Thr	Pro	Pro	Gly	Gly	Ser	Glu	Val	Val	Pro	Val
145					150					155					160
Ile	Ser	Pro	Met	Tyr	Gln	Leu	His	Arg	Arg	Ser	Glu	Gly	Thr	Pro	Arg
				165					170					175	
Ser	Asn	His	Ser	Ala	Gln	Asp	Ser	Ala	Val	Glu	Tyr	Leu	Leu	Leu	Leu
			180					185					190		
Ser	Lys	Ala	Lys	Leu	Val	Pro	Ser	Glu	Arg	Glu	Ala	Ser	Pro	Ser	Asn
		195				200						205			
Ser	Cys	Gln	Asp	Ser	Thr	Asp	Thr	Glu	Ser	Asn	Asn	Glu	Glu	Gln	Arg
	210					215					220				
Ser	Gly	Leu	Ile	Tyr	Leu	Thr	Asn	His	Ile	Ala	Arg	Arg	Ala	Gln	Arg
225					230					235					240
Val	Ser	Leu	Lys	Glu	Glu	His	Arg	Ala	Tyr	Asp	Leu	Leu	Arg	Ala	Ala
				245					250					255	
Ser	Glu	Asn	Ser	Gln	Asp	Ala	Leu	Arg	Val	Val	Ser	Thr	Ser	Gly	Glu
			260					265					270		
Gln	Met	Lys	Val	Tyr	Lys	Cys	Glu	His	Cys	Arg	Val	Leu	Phe	Leu	Asp
		275				280						285			
His	Val	Met	Tyr	Thr	Ile	His	Met	Gly	Cys	His	Gly	Phe	Arg	Asp	Pro
	290					295					300				
Phe	Glu	Cys	Asn	Met	Cys	Gly	Tyr	His	Ser	Gln	Asp	Arg	Tyr	Glu	Phe
305					310					315					320
Ser	Ser	His	Ile	Thr	Arg	Gly	Glu	His	Arg	Phe	His	Met	Ser		
				325					330						